MAKE MATH WITH PIXBLASTER

CE

- Participants will learn how to create UEB with Nemeth math equations using BrailleBlaster, Duxbury and Tiger Software Suite, specifically with linear algebra and quadratic equation examples.

- Participants will learn how to leverage MathType and MathPix for creating the math equations used above.

- Participants will learn how to plot linear algebra and quadratic equations using Desmos, Audio Graphing Calculator, IVEO and Excel.

Agenda

- Introductions
- PixBlaster Overview
- Braille, Math and Tactile Graphics
- Cool Tips and Tricks
- Demonstrations
- Other Resources
- *Questions*

ViewPlus Technologies, Inc.

Founder Prof. John

In 1988 Professor John Gardner of Oregon State University had an eye operation which caused him to become totally blind. At that time he was Professor of Physics at Oregon State University, and he continued to teach. However, he could no longer evaluate the data from experiments. This difficulty prompted him to establish a university team to research methods for better accessibility to graphical information.

In 1996 his team developed a new high resolution embossing technology and patented it. He was unable to persuade any braille embosser manufacturer to license this technology. They told him that there was no need for blind people to access graphics. He did not believe them, so he and his wife founded ViewPlus to produce embossers. In year 2000 the first product reached the market, the ViewPlus Tiger Advantage embosser, built on a dot matrix printer.

Since 2000 ViewPlus has developed many braille printers, hybrid ink/braille printers, touchpads and a Suite of Software solutions developed to be scalable; running on the small portable personal braille printer to the larger production hybrid printers. Our choice in the technology used in our embossers enables us to be the industry-leading manufacturer of high-definition tactile graphics. All are intended to make information accessible.
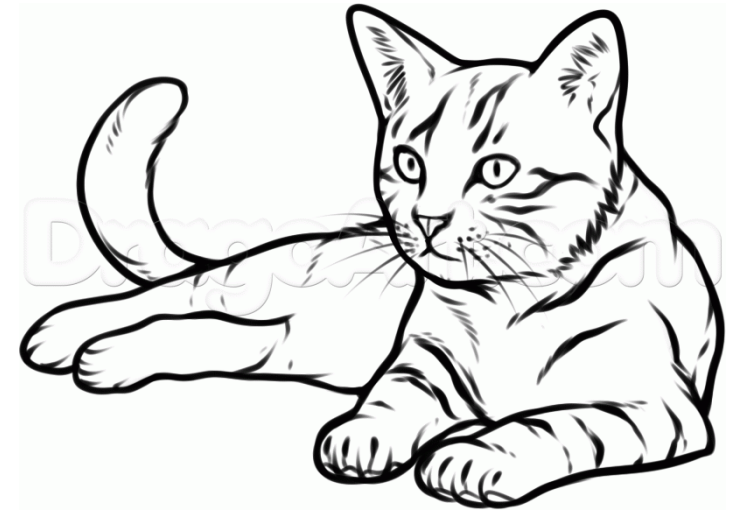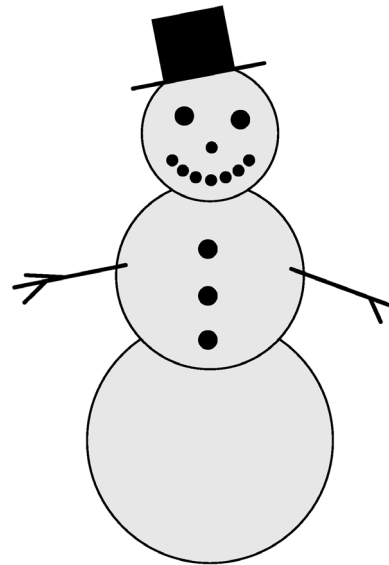
John Gardner, founder of ViewPlus

Why tactile graphics are important

- Access to information with or without Braille literacy
- Getting an early start – a learned skill
- Enabling STEAM
- Having fun

Introduction to ViewPlus

- **History of Innovation**
- **Embossers**
  - **Graphics vs braille – lots of braille choices**
  - **Graphics focus**
  - **Add ink**
  - **Mobile Printing**
- **Software**
- **Audio tactile**
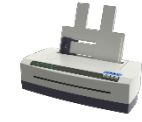- **Content available**
  - **Examples**
  - **YouTube trainings**

Embossing made easy
- Supports direct and networked WiFi
- Print to any ViewPlus embosser
- Print from your Android, iOS, or Windows PC
- Built in braille translation

Check out viewplus.com

ViewPlus Printers

|	SpotDot	EmBraille	Max	Premier	Elite	Columbia 2	Delta 2
Maximum paper size	A4 or letter or legal	A4 or letter or legal	A3 or 12" wide	A3 or 12" wide	A3 or 12" wide	A3 or 12" wide	A3 or 12" wide
Paper feeding mechanism	Cut Sheet Stack Feeder	Tractor + Single Cut Sheet	Tractor + Single Cut Sheet	Tractor Only	Tractor Only	Tractor Only	Cut Sheet Stack Feeder
Single, or double-sided embossing	Single Sided	Single Sided	Single Sided	Double sided	Double sided	Double sided	Double sided
Embossing speed in CPS	50	25	60	100	200	120	120
Ink option	300 DPI Color	No	No	100 DPI Black (with InkConnect)	100 DPI Black (with InkConnect)	No	No
Connectivity	USB & Wi-Fi (with TigerBox)	USB & Wi-Fi (with TigerBox)	USB & Wi-Fi (with TigerBox)	USB/Ethernet & Wi-Fi (with TigerBox)	USB/Ethernet & Wi-Fi (with TigerBox)	USB/Ethernet & Wi-Fi (with TigerBox)	USB/Ethernet & Wi-Fi (with TigerBox)
Software included w/embosser purchase	Tiger Software Suite (TSS)	Tiger Software Suite (TSS)	Tiger Software Suite (TSS)	Tiger Software Suite (TSS)	Tiger Software Suite (TSS)	Tiger Software Suite (TSS)	Tiger Software Suite (TSS)
Duxbury DBT support	Supported	Supported	Supported	Supported	Supported	Supported	Supported
TactileView support	Supported	Supported	Supported	Supported	Supported	Supported	Supported
Legacy mode printing support (e.g. braille notetakers)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Compatibility	Microsoft Windows printer drivers (kept up to date to current operating systems)	Microsoft Windows printer drivers (kept up to date to current operating systems)	Microsoft Windows printer drivers (kept up to date to current operating systems)	Microsoft Windows printer drivers (kept up to date to current operating systems)	Microsoft Windows printer drivers (kept up to date to current operating systems)	Microsoft Windows printer drivers (kept up to date to current operating systems)	Microsoft Windows printer drivers (kept up to date to current operating systems)
Embossing technology	Tiger	TigerPlus	Tiger	Tiger	Tiger	TigerPlus	TigerPlus
Tactile resolution	20 DPI	100 DPI	20 DPI	20 DPI	20 DPI	100 DPI	100 DPI
Embossed dot density	20 DPI	17 DPI	20 DPI	20 DPI	20 DPI	17 DPI	17 DPI
Adjustable Braille dot spacing standard	No	Yes	No	No	No	Yes	Yes
Max. paper weight	230 gsm	175 gsm	230 GSM	230 GSM	230 GSM	200 gsm	200 gsm
Device error signals	Light and beeping	Light and beeping	Light and beeping	Light and beeping	Light and beeping	Light and beeping	Light and beeping
Device audio menus	No	No	No	No	No	Yes	Yes

Tiger Software Suite

- "Tiger" Add-in to MS Office Word and Excel
  - Text to Braille conversion and document formatting
- Tiger Designer
  - Stand-alone program under Windows to edit emboss data before output on paper
  - Similar to mainstream paint program
  - Braille labels and tactile fill patterns can be created
  - File format PRN or TDSX
  - PRN file format is specific to each embosser model
  - Tiger Designer can convert PRN to TDSX format, which is generic to all ViewPlus embosser models
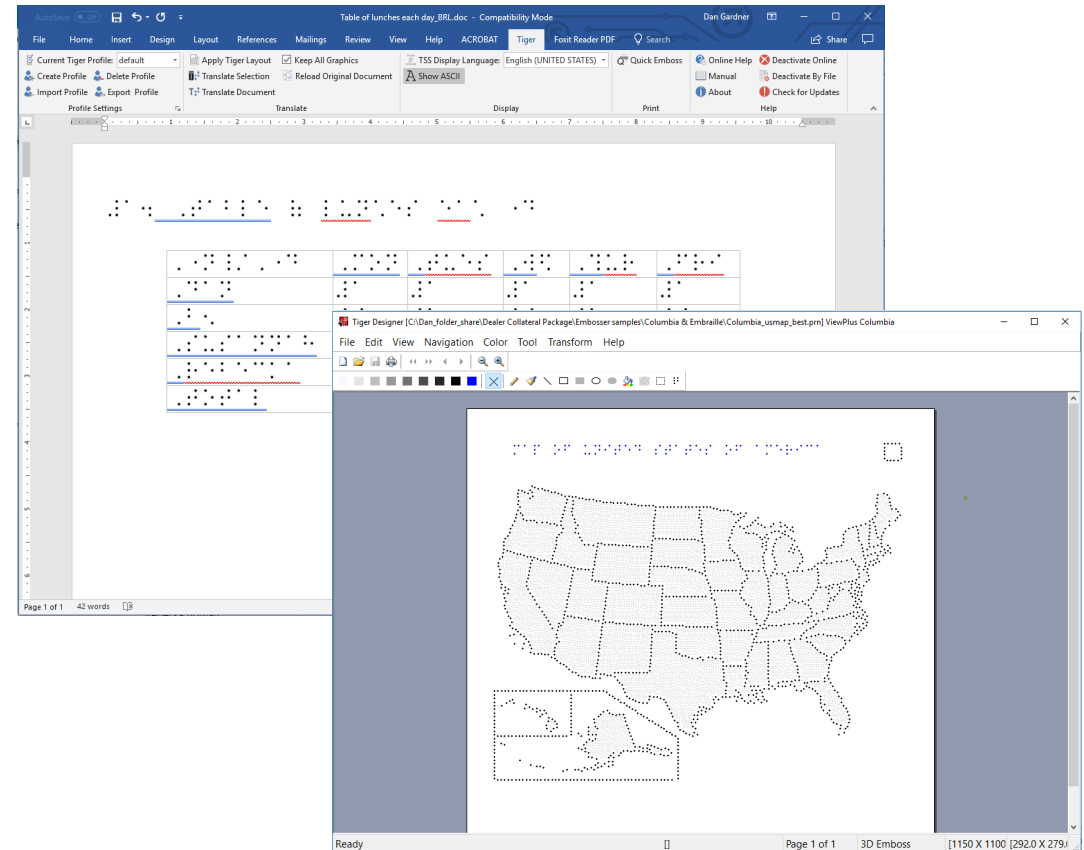
New in TSS 7

- QuickPaw
- ViewPlus Translator
  - Clip board or file
- Hide Braille in Word
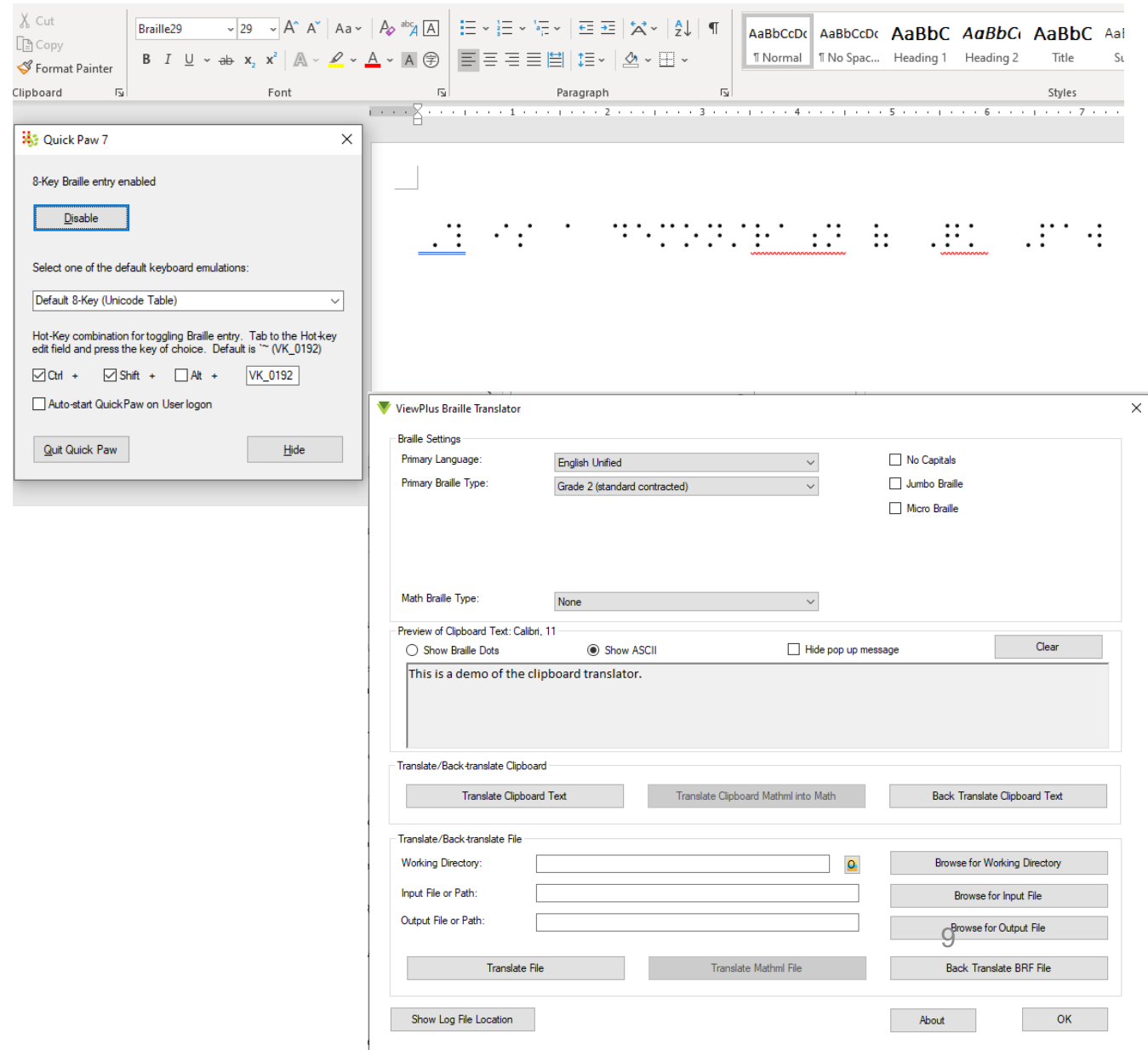
Experience Power-Dot™ Braille

- Strongest braille dot of any desktop braille printer
- Pleasing rounded dot shape
- Available on APH PixBlaster, VP Delta 2 and VP Columbia 2
- Still emboss high-resolution tactile graphics
- ViewPlus and Braillo collaboration to deliver excellent readability

IVEO 3 Hands-On Learning System

- Using sight, sound, and touch, IVEO allows users to understand tactile graphics in an engaging and interactive solution. Consisting of a powerful content creation software and an intuitive touchpad for audio-tactile response, IVEO provides unparalleled access to tactile information.

- Have you seen the Water Cycle Demonstration?
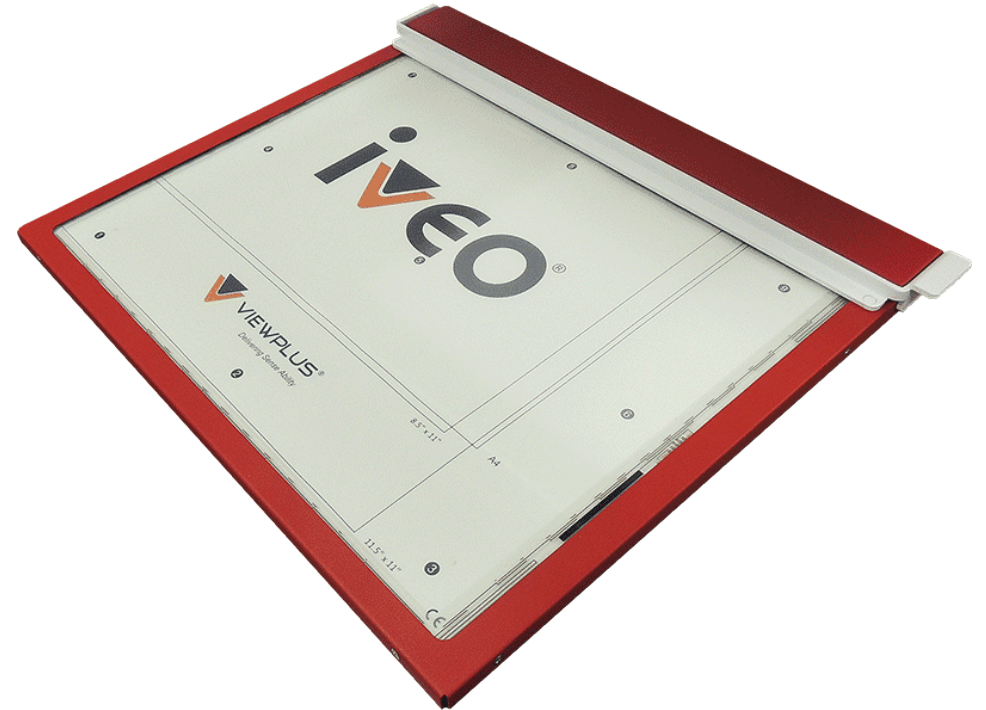
ViewPlus Audio Graphing Calculator

- **Audio Graphing Calculator**
  - Make math accessible and interactive with AGC. Individuals with visual disabilities can create, modify, and experience mathematical equations and get instant feedback with intuitive tones.
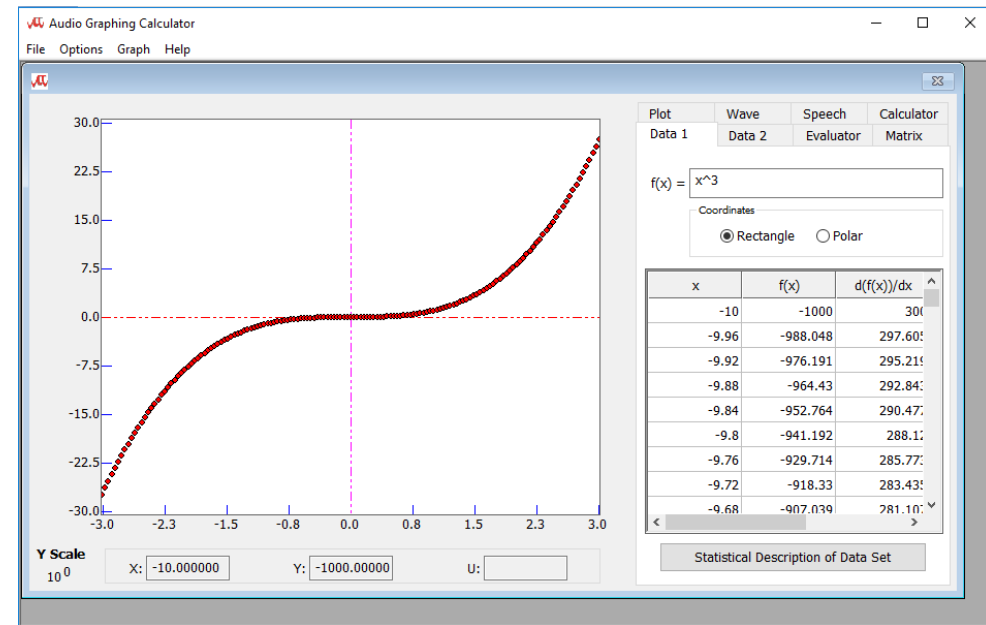
OVERVIEW

Why Blaster?

- Blaster represents a commitment by APH to "blast" down barriers to braille.
  - The younger a person learns braille, the more likely they will become a lifelong braille reader.
  - Braille literacy is key to understanding spelling, punctuation, and grammar, which are vital for success.
- Audio is no replacement for the written word!

What to Expect

- High-quality braille
    - Tractor-fed paper
    - Interpoint capabilities
- APH documentation
- Videos for embosser and related software
- Customer support
- Cost: $3995 and available on quota

What is PixBlaster?

PixBlaster Features

- Everything you need in one box. Comes with a speaker and the PIXie
- Easy to use software interface
- High-quality tactile graphics
- New dot technology: Power-Dot Braille
- Works great with software you're already familiar with
- Comes with Tiger Software Suite

What is PIXie?

- Adds wireless capabilities to PixBlaster.
- Access to PIXie interface

PIXie Interface

Graphic Embossing

- Emboss graphic from JPG or PNG using Photos- a standard Windows app
- Emboss PDFs from Adobe
- Use Tiger Designer for image editing, to emboss PRNs, and create new graphics
  - Add fill patterns
  - Shape Tools
  - Adjust density

Simple conversions in driver or Tiger Designer

- Don't have one of our printers – use print to file
- Windows Printer Driver
  - "What you see is what you get" printing from any Wi program
  - Screen colors are converted to grey scale with "only shades
  - Each shade of grey will be embossed with a differen as darker the color as higher the dot, where the high dot is equal to a Braille text dot
  - Braille screen fonts install with printer driver
  - Advanced settings to invert colors, adjust contrast and brightness, plus thicken lines
  - Create PRN file when printing to ViewPlus embosser applying 'print to file' option
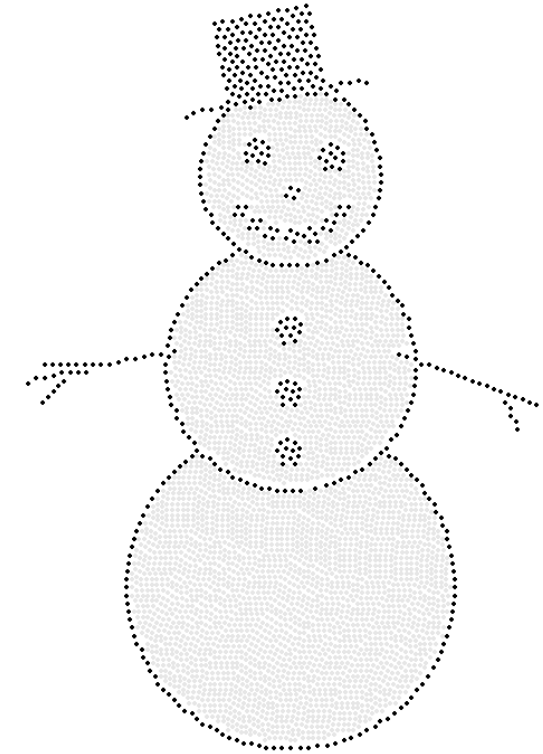
Adding Braille

- Open graphic is native editing tool
    - Type directly in Braille29 font
    - Use clip board translator
    - Put all phrases or titles into a Word doc and cut and paste into other applications
- Import into MS Word
- Use Tiger Designer or IVEO TransformerPro

Cool Stuff

- Mathpix – OCR for math equations
- MathType equation editor
- Desmos online calculator
- Talking LabQuest

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

x=\frac{-b \pm \sqrt{b^{2}-4 a c}}{2 a}

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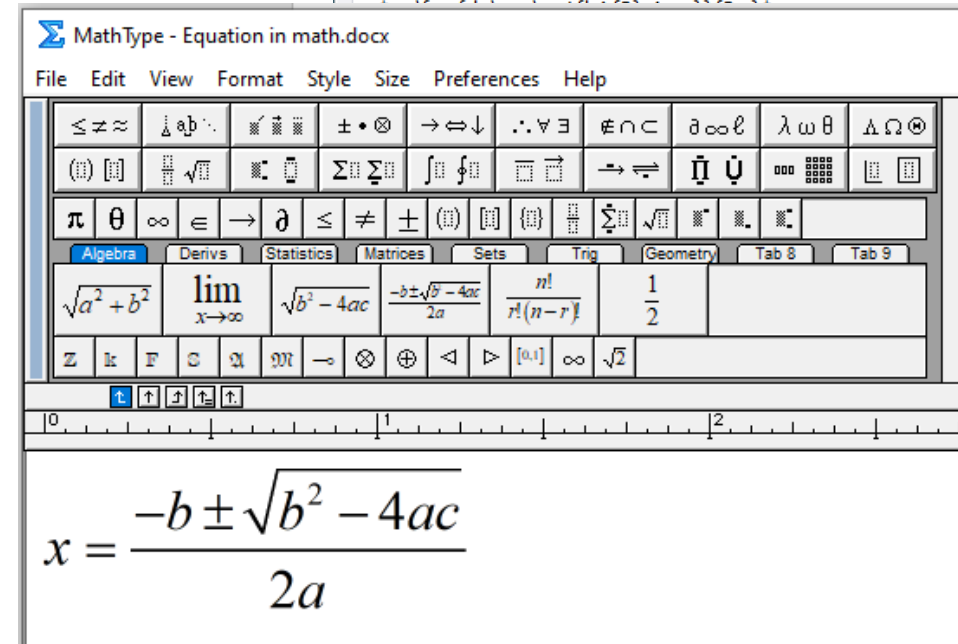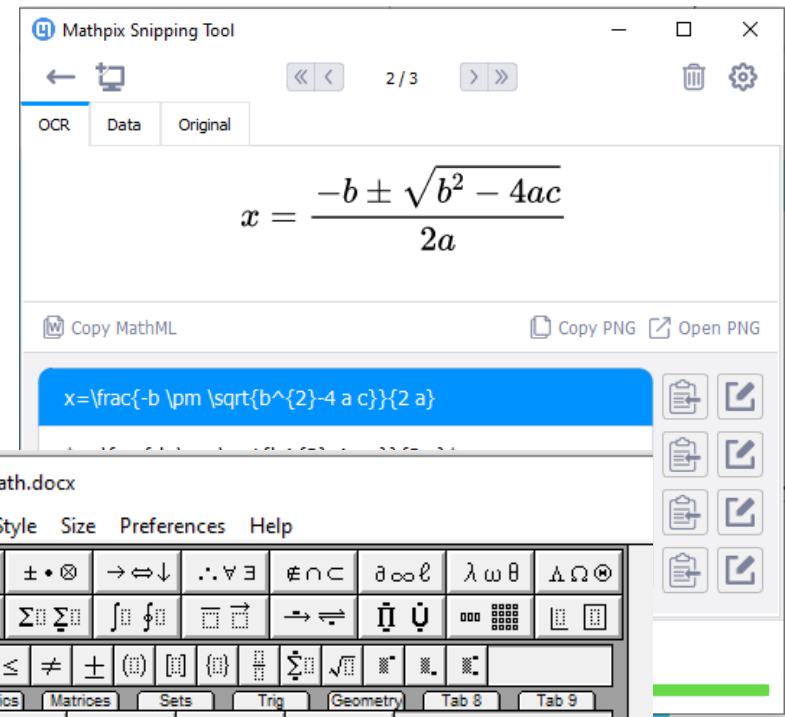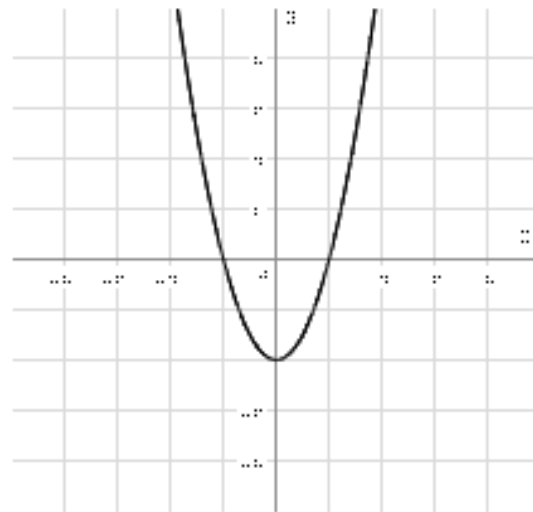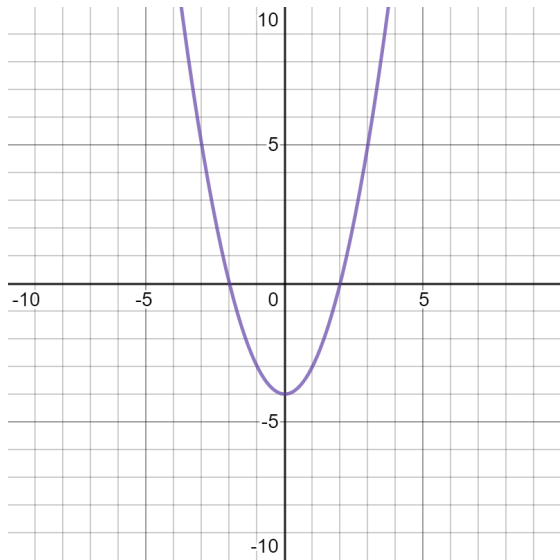
Demonstrations

- UEB with Nemeth math in Duxbury, TSS and BrailleBlaster
  - MathType for Duxbury and TSS
  - MathPix helps for all
- Graphing Equations in Desmos, AGC and Excel
- Tactile Graphics (thermometers, rulers, clocks, etc.)
- Spacial Math in BrailleBlaster

- Not Today
  - Excel Tables and Charts, including adding custom fill
  - Maps
  - Other High Interest Demos
    - Business Cards
    - Greeting Cards
    - Labels

Linear Equations

(extracted from Wikipedia, equations added with MathType)

- A linear equation in two variables is then denoted as

$$ax + by + c = 0$$

- Slope–intercept form
  - This form relies on the habit of writing $y = f(x)$ and the conventional way of assigning the variables of the linear equation to the axes of a Cartesian coordinate system, drawn in the conventional manner as described above. This form exists only for $b \neq 0$ allowing to isolate y on the left-hand side

$$y = mx + y_0$$

Linear Equations (continued)

(extracted from Wikipedia, equations added with MathType)

- This way the slope $m = -\dfrac{a}{b}$ describes the inclination of the straight line which is the graph of this equation
  - The slope is positive for a line ascending to the right and negative, if the line ascends to the left.
  - A zero-slope $m = 0$ belongs to a horizontal line.
- The y-intercept $y_0 = -\dfrac{c}{a}$ fixes the point $(0, y_0)$ where the line crosses the y-axis, and $y_0 = 0$ characterizes lines that cross the origin $(0,0)$.

Compare to Simple Examples
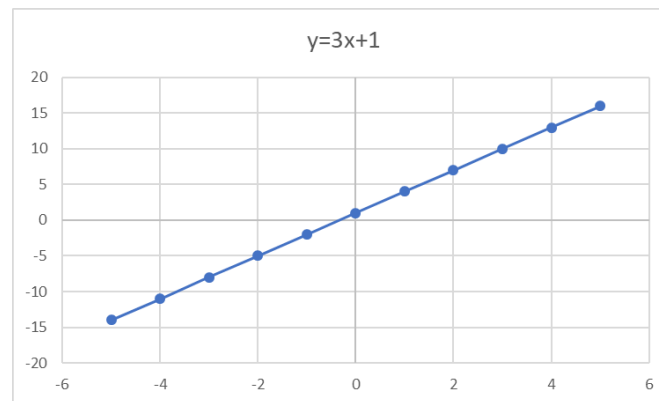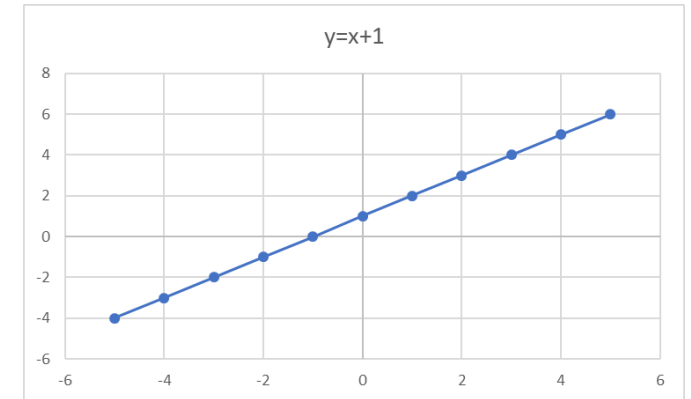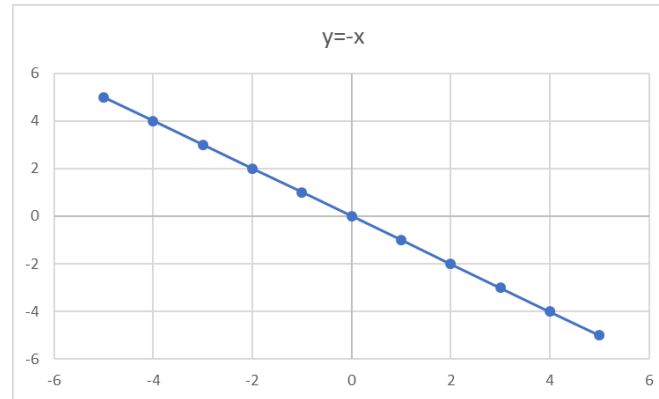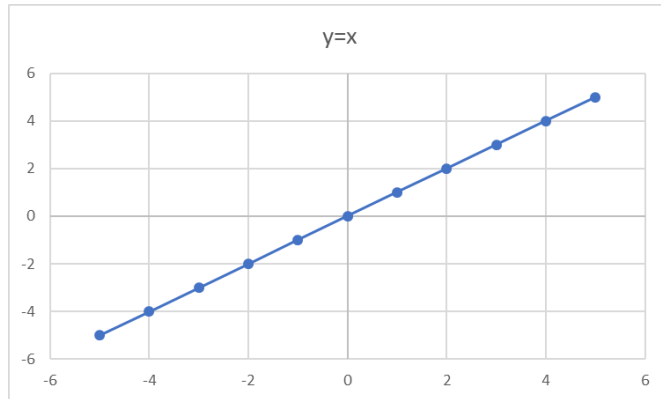
- Show how slope is rise/run
- Positive vs negative slope
- The y-intercept is where line crosses the vertical axis at x=0

Include Braille
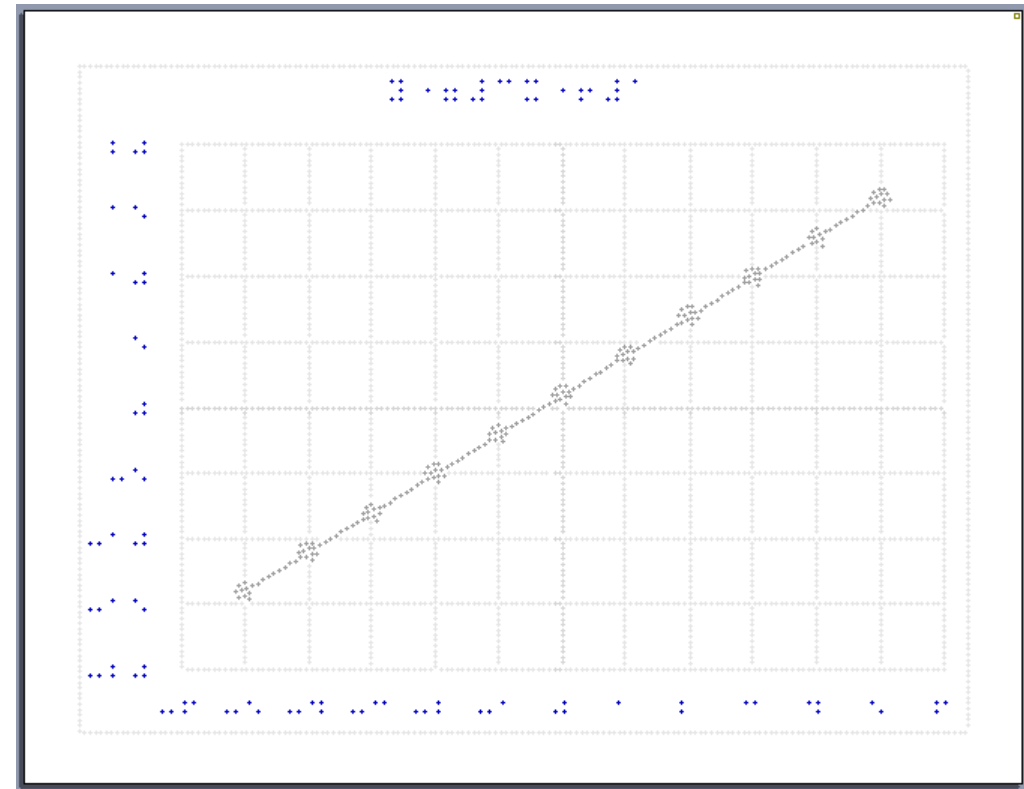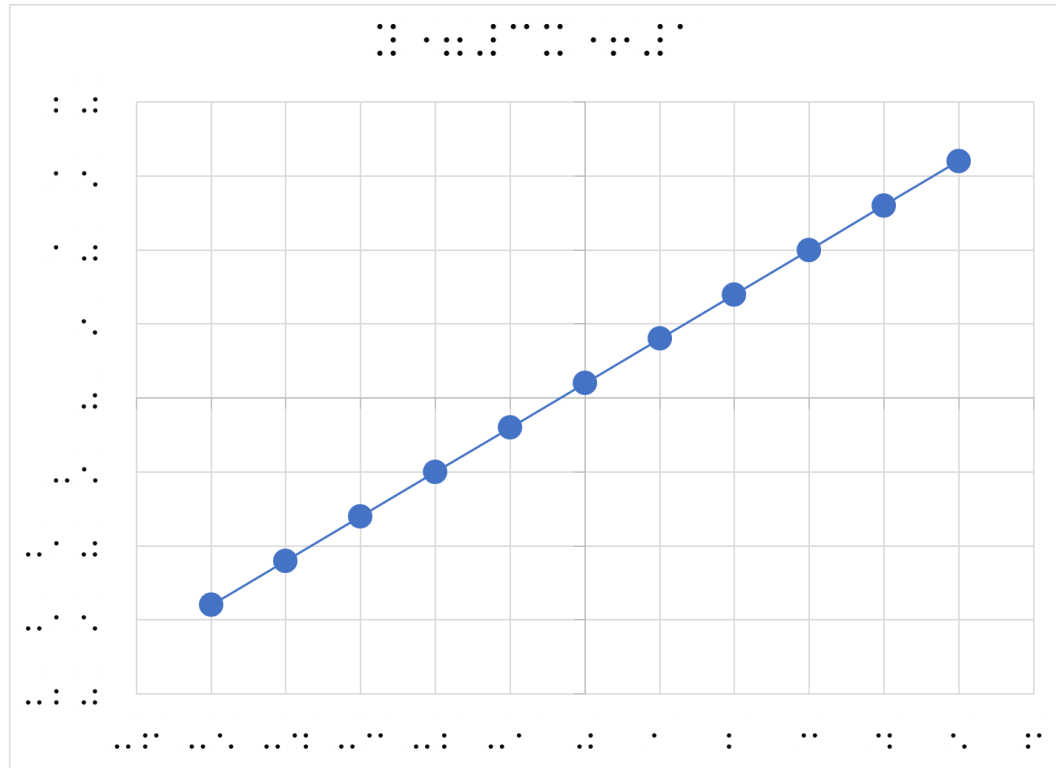
Quadratic Equation

- $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ to solve any equation $ax^2 + bx + c = 0$

- Examples
  - $x^2 - 4 = 0$ solutions are $x = \pm 2$
  - $x^2 - 6x + 5 = 0$ solutions are $x = 5$ and $x = 1$

- In Excel, solve to solutions to *x* with equations
  - X1=(-$B2+SQRT($B2^2-4*$A2*$C2))/(2*$A2)
  - X2==(-$B2-SQRT($B2^2-4*$A2*$C2))/(2*$A2)

a	b	c	x1	x2
1	0	-4	2	-2
1	-6	5	5	1

Quadratic Equation (continued)

$y=x^2-4$

$y=x^2-6x+5$
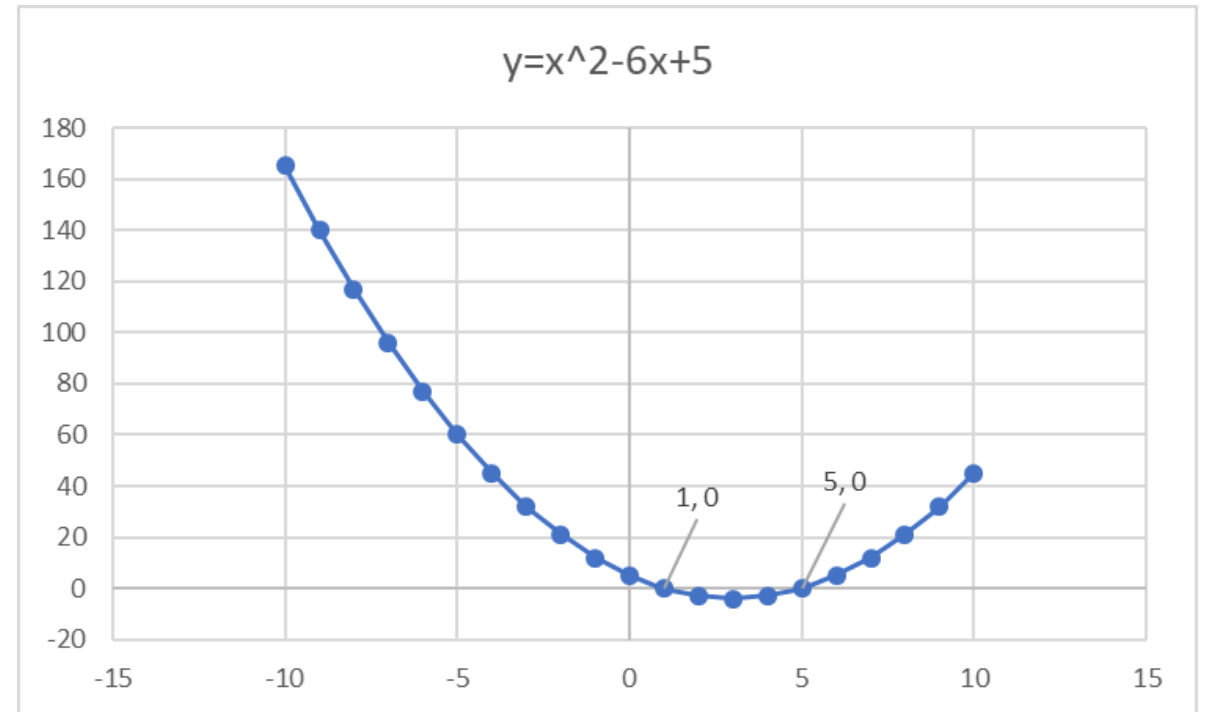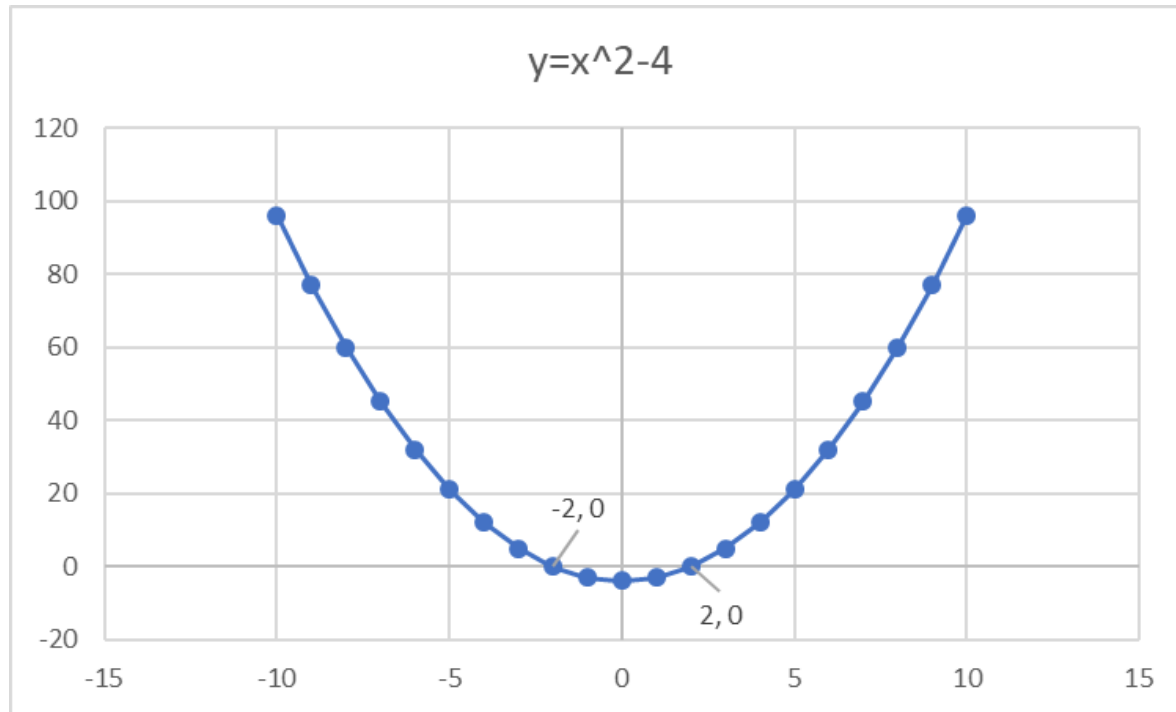
Using Audio Tactile for non-Braille Readers

- Blind students are typically expected to have tremendous memories or do much of the work in their heads

- Worksheets for complex addition, subtraction, multiplication and division to replicate algorithmic methods used with pencil and paper

- Accessible versions of many tools can be played directly on IVEO (coming soon)
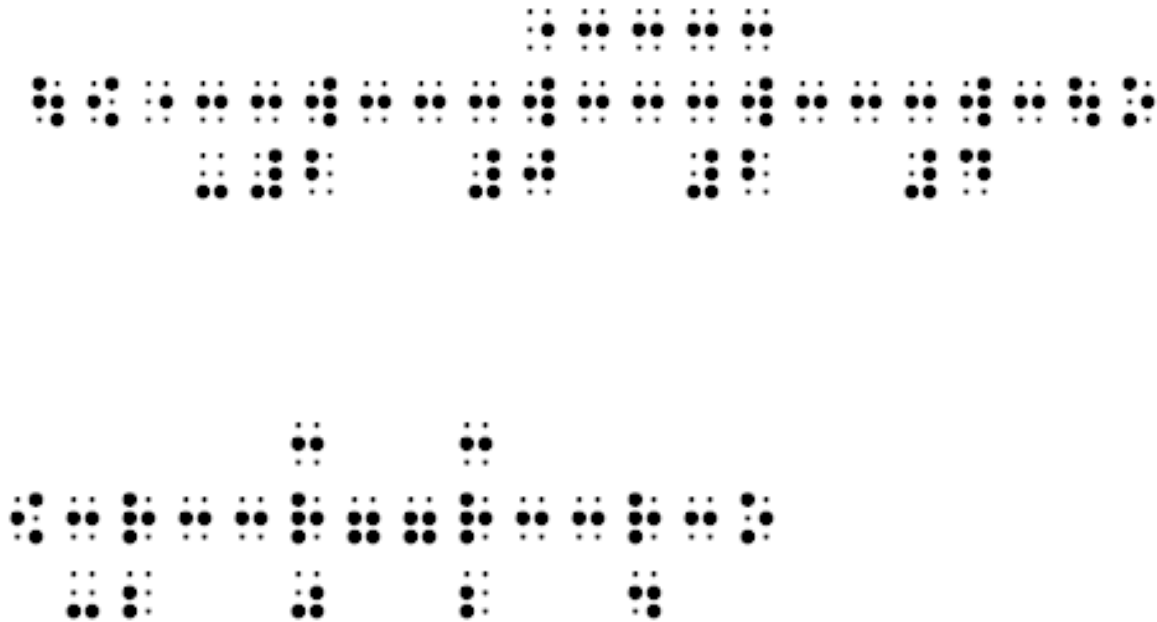
- Combining sonification and tactile plots

Common STEM Requests

- Thermometers
- Clocks
- Rulers—inches/centimeters
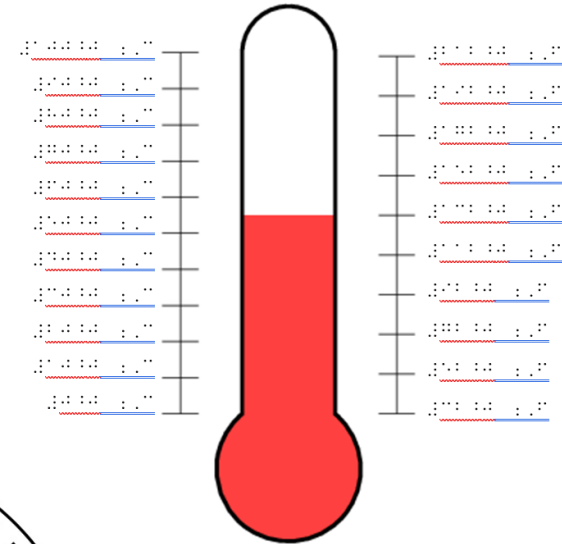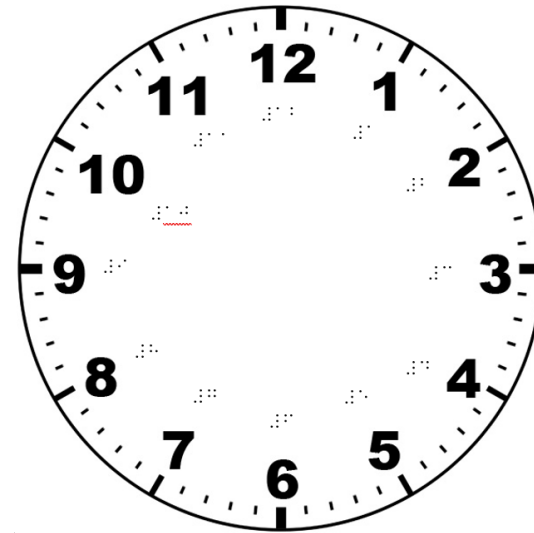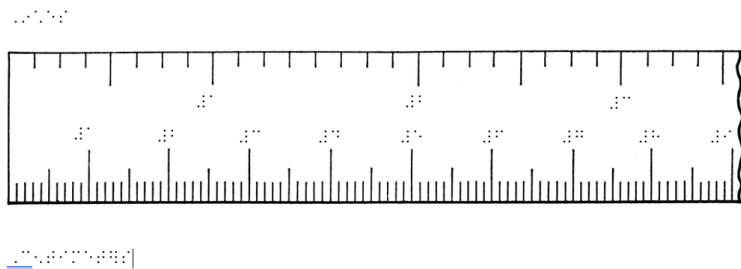
Spatial Math in BrailleBlaster

- Create Number Lines, Spatial Equations, and Matrices all by filling out a simple form.
- Switch between Nemeth and UEB with ease.
- Lots of options!

Number Lines

Spatial Equations

Matrices

More Resources

- ViewPlus.com - https://viewplus.com/
- BrailleBlaster - https://www.brailleblaster.org/
- Tactile Graphics Image Library - https://imagelibrary.aph.org/
- IRIE-AT for Duxbury and TactileView Training - https://irie-at.com/

Other Ways We can Help

- Print on Demand
- Free Samples
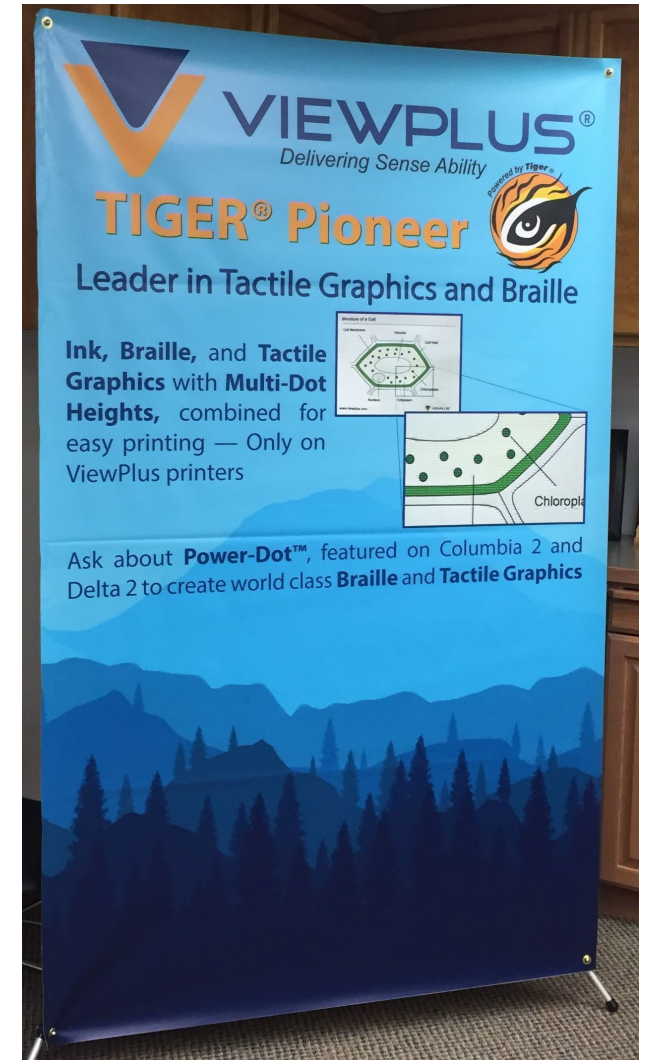
Call to action

- Extended trial version of TSS
- Send Dan a PRN file and he'll print it for you
- Schedule a call or training
- Come visit us in Corvallis, once COVID is over

Email Dan at dan.gardner@viewplus.com

Q & A

- What additional demos can I show right now?
- What training topics interest you the most?
- How effective was this experience?
- What would have made it better?

MAKE MATH WITH PIXBLASTER

AMERICAN PRINTING HOUSE FOR THE BLIND